



EV5061-QV-00A

28V, 7mΩ R_{DSon} Hot-Swap Protection Device with Current Monitoring

DESCRIPTION

The EV5061-QV-00A is an evaluation board for MP5061. The MP5061 is a hot-swap protection device designed to protect circuitry on its output from transients on its input. It also protects its input from undesired shorts and transients coming from its output.

An internal charge pump drives the gate of the power device, allowing for a power FET with a very low ON resistance of 7mΩ.

The MP5061's fault protections include current-limit protection, thermal shutdown, and damaged-MOSFET detection. Both the current limit and thermal shutdown have user-settable auto-retry and latch-off mode. The device also features under-voltage protection.

The EV5061-QV-00A is a fully assembled and tested evaluation board.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V _{IN}	4.5-28	V
Output Voltage	V _{OUT}	4.5-28	V
Output Current	I _{OUT}	10	A

FEATURES

- Integrated 7mΩ Power FET
- Adjustable Current Limit (5A to 15A)
- 36V Input Transient before V_{OUT} Startup
- Output Current Measurement
- ±5% Current Monitor Accuracy
- Fast Response (<200ns) for Short Protection
- PG Detector and FLTB Indication
- PG Assert Low at V_{IN}=0
- Damaged MOSFET Detection
- External Soft-Start
- Under-Voltage Lockout
- Thermal Protection
- Small QFN-22 (3mm × 5mm) Package

APPLICATIONS

- Hot Swappable
- PC Card
- Disk Drives
- Laptops

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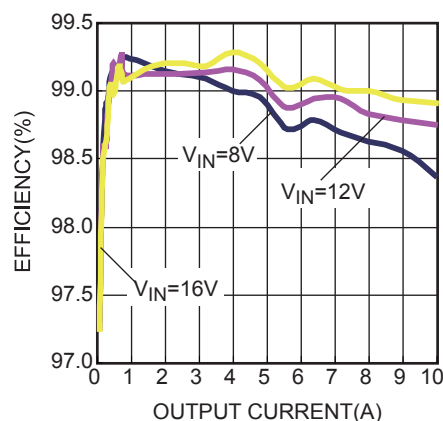
EV5061-QV-00A EVALUATION BOARD



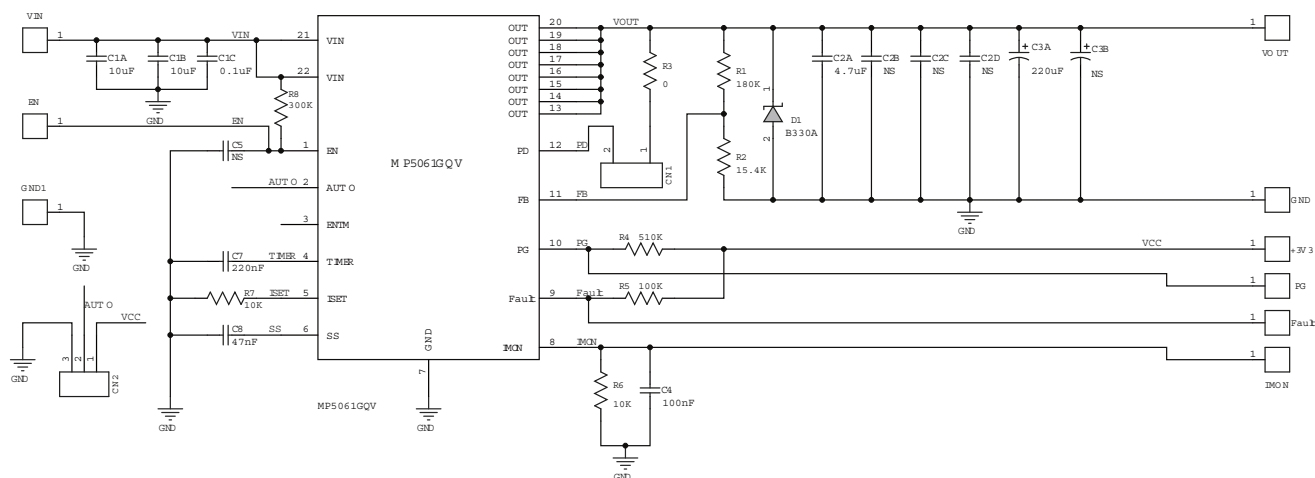
(L x W x H) 8.55cm x 8.55cm x 1.6cm

Board Number	MPS IC Number
EV5061-QV-00A	MP5061GQV

Efficiency vs. Load Current



EVALUATION BOARD SCHEMATIC



PD: PD pin connects to the output to enable discharge function.

TIMER: Timer sets the hot-plug-insertion time delay, fault timeout period, and restart time.

Auto: Connect to +3V3 or float to enable auto-retry mode, connect to GND to enable latched-fault mode.

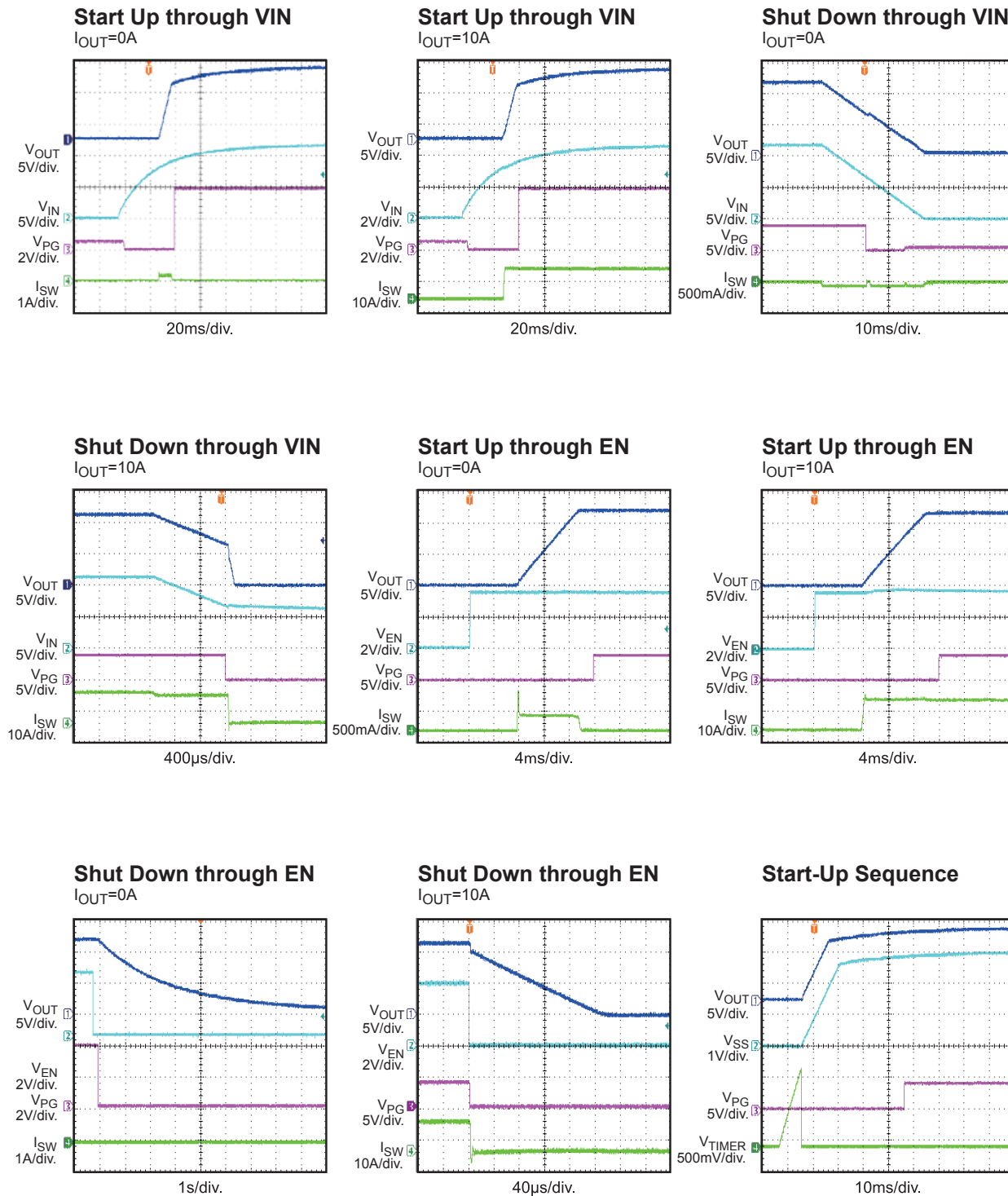
EV5061-QV-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer_P/N
2	C1A,C1B	10 μ F	Ceramic Capacitor, X5R, 25V	1206	Murata	GRM31CR61E106KA12L
1	C1C	0.1 μ F	Ceramic Capacitor, X7R, 25V	0805	Murata	GRM21BR71E104KA01L
1	C2A	4.7 μ F	Ceramic Capacitor, X5R, 25V	0805	Murata	GRM21BR61E475KA12L
1	C3A	220 μ F	220uF/25V	DIP	WE	860080474010
1	C4	0.1 μ F	Ceramic Capacitor, X7R, 16V	0603	Murata	GRM188R71C104KA01D
1	C7	220nF	Ceramic Capacitor, X7R, 16V	0603	WE	885012206048
1	C8	47nF	Ceramic Capacitor, X7R, 16V	0603	Murata	GRM188R71C103KA01D
1	R1	180k	Film Resistor, 1%	0603	Yageo	RC0603FR-07180KL
1	R2	15.4k	Film Resistor, 1%	0603	Yageo	RC0603FR-0715K4L
1	R3	0 Ω	Film Resistor, 1%	0603	Yageo	RC0603FR-070RL
1	R4	510k	Film Resistor, 1%	0603	Yageo	RC0603FR-07510KL
1	R5	100k	Film Resistor, 1%	0603	Yageo	RC0603FR-07100KL
2	R6,R7	10k	Film Resistor, 1%	0603	Yageo	RC0603FR-0710KL
1	R8	300k	Film Resistor, 1%	0603	Yageo	RC0603FR-07300KL
1	D1	Schottky Diodes, 30V, 3A	Diode	SMA	any	B330A
1	U1		Electronic Fuse	QFN22	MPS	MP5061GQV
4	VIN,VOU T,GND		Power input pins	TP2MM		
6	EN, PG,Fault, IMON, +3V3,GN DSENSE		Test point pins	TP1MM	any	any

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN}=12V$, $C_{OUT}=220\mu F$, $C_T=220nF$, $C_{SS}=47nF$, $R_{SET}=10k\Omega$, $T_A=+25^\circ C$, unless otherwise noted.



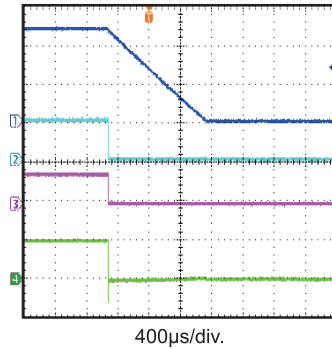
EVB TEST RESULTS (*continued*)

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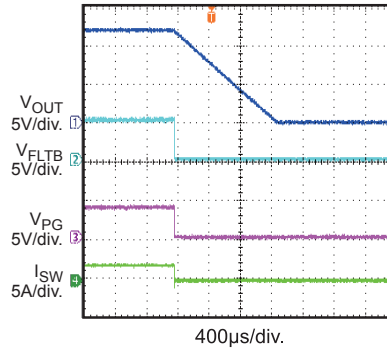
Thermal Shutdown

$I_{OUT}=2A$, Latch mode



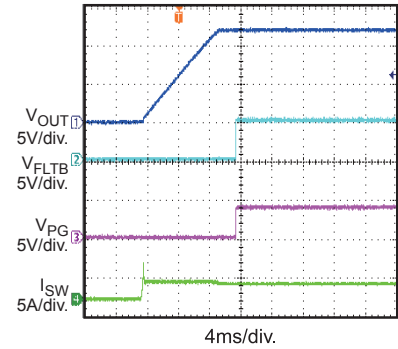
Thermal Shutdown

$I_{OUT}=2A$, Retry mode



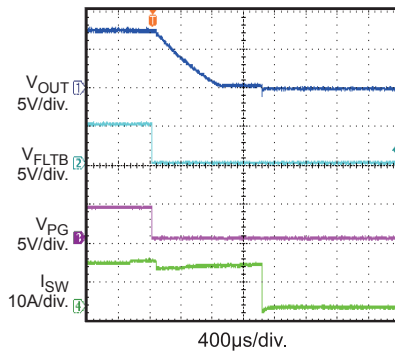
Thermal Recovery

$I_{OUT}=2A$, Retry mode



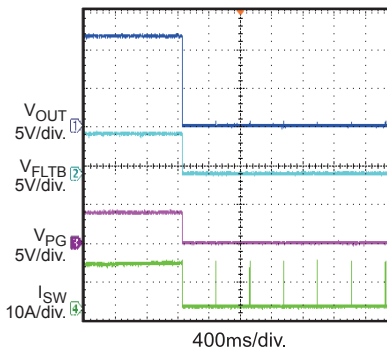
OCP

$V_{IN}=12V$, Latch mode



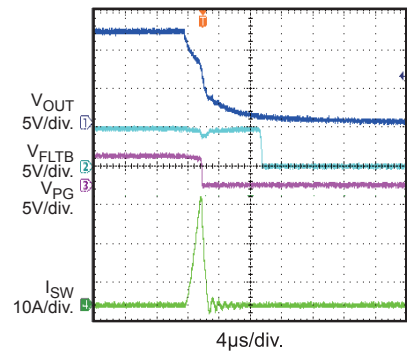
OCP

$V_{IN}=12V$, Retry mode



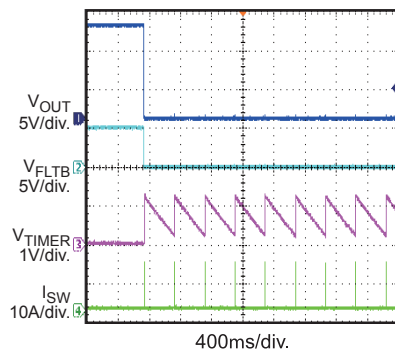
SCP Entry

$V_{IN}=12V$, Latch mode



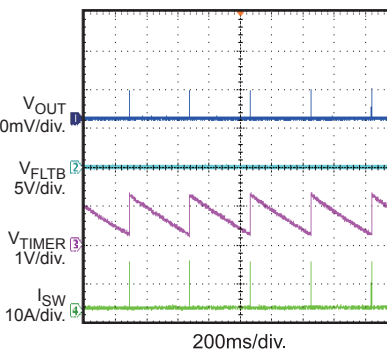
SCP Entry

$V_{IN}=12V$, Retry mode



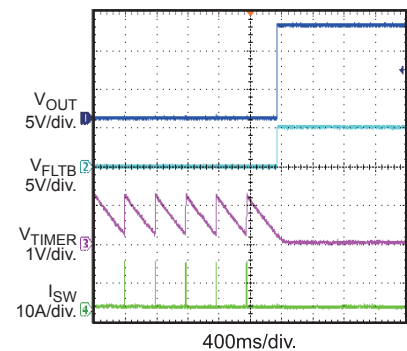
SCP Steady State

$V_{IN}=12V$, Retry mode



SCP Recovery

$V_{IN}=12V$, Retry mode



PRINTED CIRCUIT BOARD LAYOUT

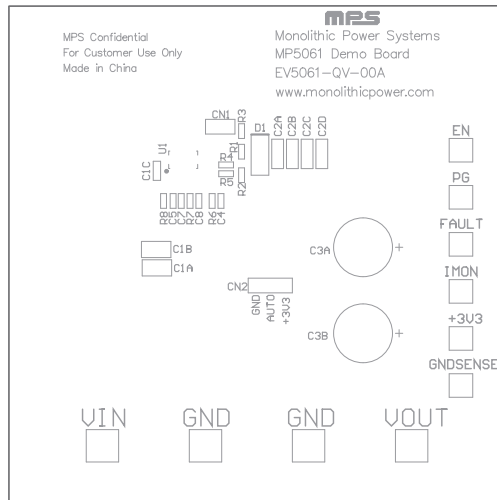


Figure 1: Top Silkscreen Layer

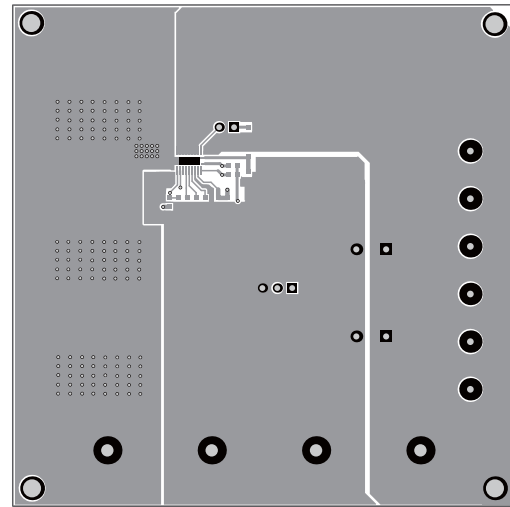


Figure 2: Top Layer

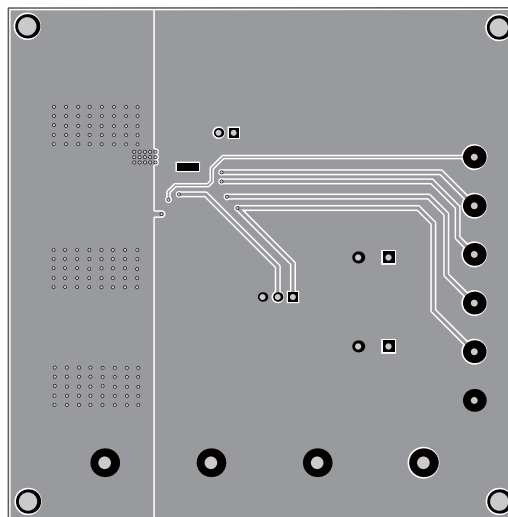


Figure 3: Bottom Layer



QUICK START GUIDE

1. Attach the positive and negative ends of the load to the VOUT and GND pins, respectively. Set the load current between 0A to 10A.
2. Preset the power supply output between 4.5V to 28V, and then turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to Vin and GND pins, respectively.
4. Turn the power supply on, the board will automatically startup.
5. Apply the AUTO pin to +3V3 or float can select auto-retry mode and applying the AUTO pin to GND can select latched-fault mode.

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